DISPLAY DEVICE

The invention relates to a display device according to the preamble of Claim 1.

Display devices with scales, which graphically display information, are used in all fields of technology and inform people of many different conditions of machines and equipment and about many different circumstances. A very narrow application range involves the vehicle field, where vehicle operating conditions are provided to the vehicle operator by means of display devices. Although the present invention will be described relative to this field, this description should not be limiting.

More or less space for the transmission of information is available depending on local situations and the extent of the display. In the case of vehicles, for example, an increasing number of scale marks must be shown in the area of speedometer readings as a result of higher maximal speeds. Furthermore, the available space is increasingly reduced because of additional display devices, such as the rotational speed, the tank, the navigation devices, etc. On the whole, the display units are therefore becoming smaller and are consequently more difficult to read. In the case of older far-sighted persons or at a short

glance, problems arise with respect to the recognition. Similar problems also occur in other areas where generally little space is available for display instruments.

It is an object of the invention to further develop a display device of the initially mentioned type in that the information displayed thereby can be absorbed rapidly and reliably.

This object is achieved by means of the characteristics indicated in Claim 1.

A core idea of the invention is the representation of the graphic information in an area in order to change and emphasize the actual position of the indicator element with respect to the normal representation. The type of the changes can be freely selected. In particular, it is possible to enlarge the graphic information, to image it with a higher contrast, to indicate it in a different color or to displace it.

For example, normal indicator needles or graphic indicators, (such as marks in the scale) can be used as the indicator element.

As a result of the emphasis, a viewer is automatically

directed to the area of the scale in which the indicator element is situated. As a result, he can particularly rapidly and reliably recognize the information supplied by the indicator element.

A particularly preferred embodiment of the invention is characterized in that the area in which the emphasizing takes place is selected as a function of input information. In particular, the size and position of the area can be changed. By changing the area, additional information can be transmitted, for example, information concerning due movements of the indicator element.

In addition or as an alternative to the change of the area, the display of the graphic information in the area itself can also be changed. These changes may be predefined or be made a function of parameters. If the emphasizing is generated by enlargements of the graphic information, a decrease of the enlargement, for example, can take place with an increasing distance from the indicator element. As an alternative, a change of color or position depending on the distance of the indicator element is also possible.

A particularly advantageous embodiment can be implemented by means of a video screen display as an indicator unit. On the

display, the graphic information can be changed in a simple manner. In contrast to a normal instrument dial indication, in the case of a display, it is possible in a simple manner to show numbers or letters in an enlarged fashion, in color or displaced. The display unit, particularly the video screen display, is preferably controlled by a control device. The required parameters are fed to the control device, are processed by it and are transmitted in a processed form to the display unit.

A useful method of application of the invention exists in the case of a vehicle instrument. For example, the speedometer can be constructed in the manner described above.

The invention will be described in the following with respect to a speedometer and with respect to the attached drawings.

Figure 1 is a simple schematic diagram of an embodiment of the invention.

Figure 2 is a representation of a speedometer whose scale is enlarged according to the invention around the indicator element;

Figures 3a and 3b as well as

Figures 4a and 4b are representations as in Figure 2, in

which case the areas in which the enlargements take place are changed.

Figure 1 is a schematic view of a video screen display 10 which is connected with a control device 12. The control device 12 receives input information, specifically in the present case, the vehicle speed v and the rotational engine speed n.

On the video screen display 10, an indicator 13 is shown which indicates the vehicle speed v on a scale 11 (not shown in Figure 1). In addition to scaling lines, the scale 11 has number presentations which explicitly indicate the speed in km/h. By generating the scaling and the numbers on the video screen display 10, the information can be selected in all different sizes and positions.

Conventionally, all information over the entire scale is indicated in a uniform size.

In a manner according to the invention indicated in Figure 2, an area B is defined around the actual position of the indicator 13, in which the numbers are shown in an enlarged manner (compare Figure 2). In this case, the size of the enlargement depends on the distance of the respective number information from the momentary indicator position. According to

Figure 2, number 80 is shown to be the largest and number 60 is the second largest. All other numbers have the normal size. Area B is determined in the control device 12 on the basis of the input parameters v and n and is distributed symmetrically around the actual indicator position.

Naturally, the emphasizing on the video screen display can also be implemented by shifts of the information, color changes or a higher contrast.

As a result of the emphasis, a driver's glance, when briefly looking at the speedometer, is automatically directed to the enlarged area so that he can easily and rapidly detect the speed information specified more precisely by the indicator 13.

By means of Figures 3a, 3b, 4a and 4b, it is illustrated how additional information can be transmitted by the selection of the area of the emphasis.

In the case of accelerations, the area is shifted toward the higher speeds (compare Figure 3a), so that the speeds are emphasized in an area toward which the indicator 13 is moving. In the embodiment according to Figure 3a, the area B starts at the indicator 13 and is oriented toward the higher speeds.

Analogously, during braking operations, the area B is shifted toward lower speeds (compare Figure 3b). In this case, the size of the enlargement is again dependent on the distance of the number information from the actual indicator position. On the whole, in the embodiments according to Fig 3a and 3b, the area is shifted from its position round the actual indicator position depending on the driving dynamics.

However, it is not only the location of the area that can be changed. The extent or dimension of the area B can also be adjusted. In Figures 4a and 4b, a representation is selected, in the case of which size of the area of the emphasis depends on the extent of the acceleration. In the case of higher accelerations (Figure 4a), an emphasizing is carried out in a larger area B than in the case of a less high acceleration (compare Figure 4b).

To this extent, an area of emphasis shifted around the actual indicator position is a looking ahead toward a future driving speed, so that an acknowledgment can be made concerning the extent of the speed change. This acknowledgment is particularly clear when scale lines are used in addition to the numbers for indicating the prediction (compare, for example, Figures 3a and 4b).

On the whole, in the case of the above-mentioned embodiment,